

Monthly Marine Biotoxin Report

June 2014

Technical Report No. 14-13

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of June, 2014. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

Southern California Summary:

Paralytic Shellfish Poisoning

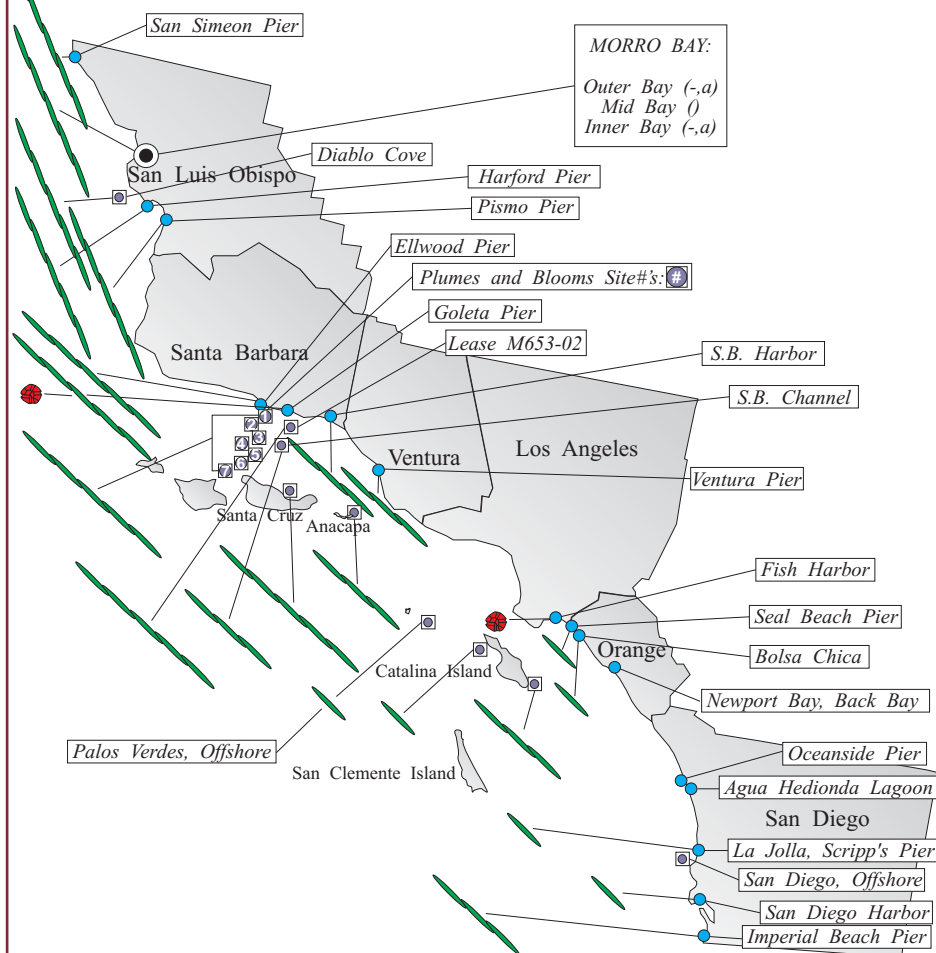
Alexandrium was observed at two sites in two counties in June (Figure 1). PSP toxins were not detected in any shellfish samples in June (Figure 3).

Domoic Acid

Pseudo-nitzschia was observed along the entire southern California coast (Figure 1).

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during June, 2014.



Relative Abundance of Known Toxin Producers

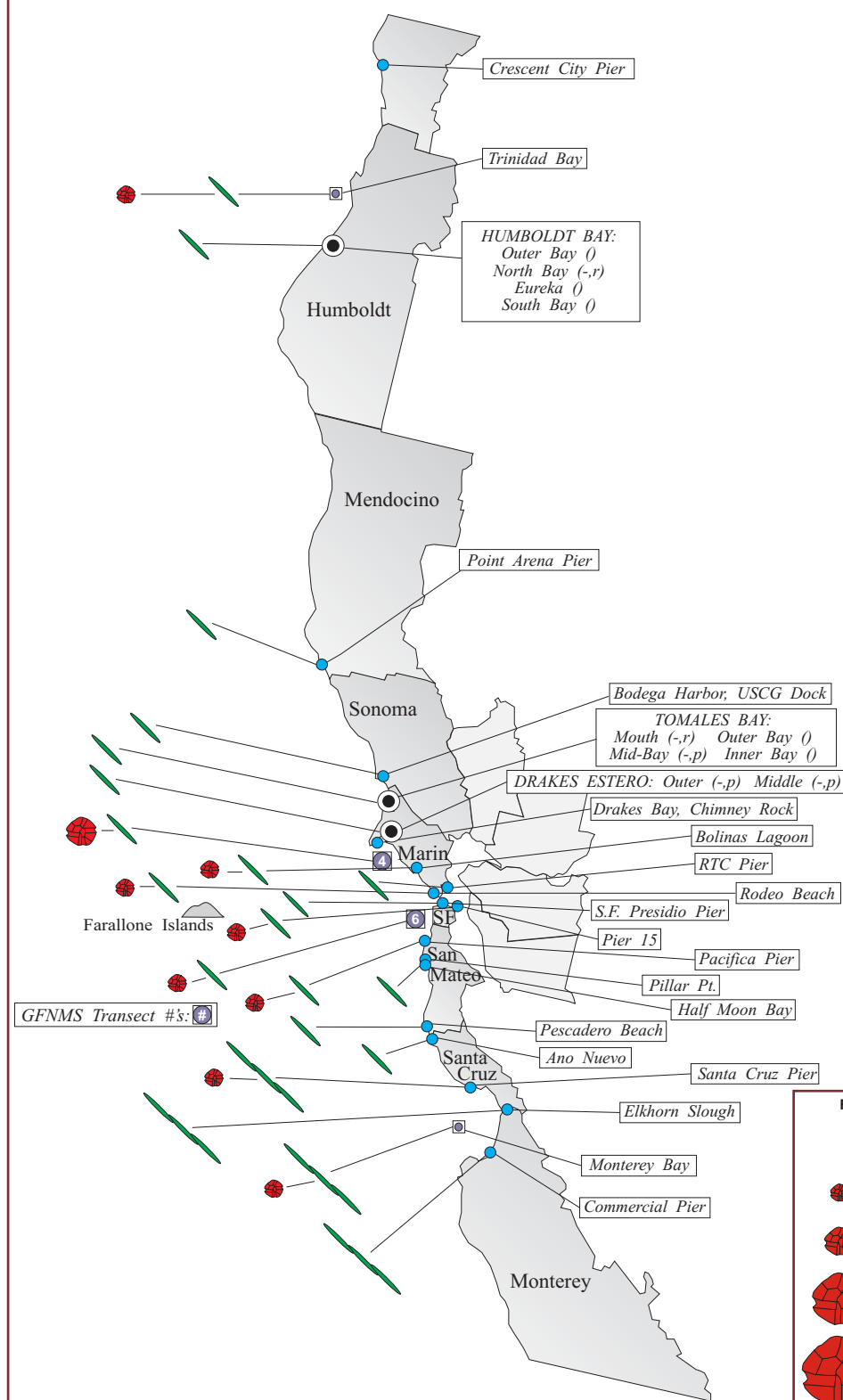
Alexandrium Species		Pseudo-nitzschia Species	
	Rare (less than 1%)		Present (less than 10%)
	Present (between 1% and 10%)		Common (between 10% and 50%)
	Common (between 10% and 50%)		Abundant (greater than 50%)
	Abundant (greater than 50%)		

MONTHLY SAMPLING STATIONS:

For areas with multiple sampling stations, species abundance at each station is represented as follows:
(a,p) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

Figure 2. Distribution of toxin-producing phytoplankton in Northern California during June, 2014.



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The percent composition of this diatom was abundant in San Luis Obispo and Santa Barbara county sampling sites, however the cell mass was generally low. The highest relative abundances were observed at San Simeon Pier (June 13, 20, 27) and Diablo Cove (June 5). *Pseudo-nitzschia* was abundant at the Plumes and Blooms sites (#1-#7) in the Santa Barbara Channel on June 12.

Domoic acid was detected from San Luis Obispo to Los Angeles counties (Figure 3). Low levels of toxin were detected in shellfish samples from the following locations: Morro Bay aquaculture leases (June 16 and 18), offshore aquaculture lease (Santa Barbara; June 15) and Mussel Shoals (June 16). Crab samples were collected by CDPH Food and Drug Branch in Santa Barbara and Los Angeles counties. The majority of crab viscera samples were below the alert level for domoic acid. One sample of crab viscera collected offshore of Gaviota was above the alert limit (43 ppm).

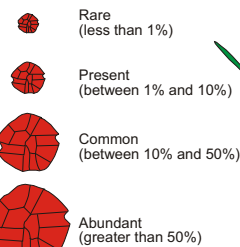
Non-Toxic Species

The diatom *Chaetoceros* was commonly found along the southern California coast. *Thalassiosira* was abundant at a few San Luis Obispo sites. The dinoflagellates *Ceratium furca* and *Prorocentrum micans* were common in Santa Barbara at the

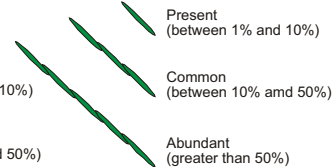
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Relative Abundance of Known Toxin Producers

Alexandrium Species



Pseudo-nitzschia Species



MONTHLY SAMPLING STATIONS:

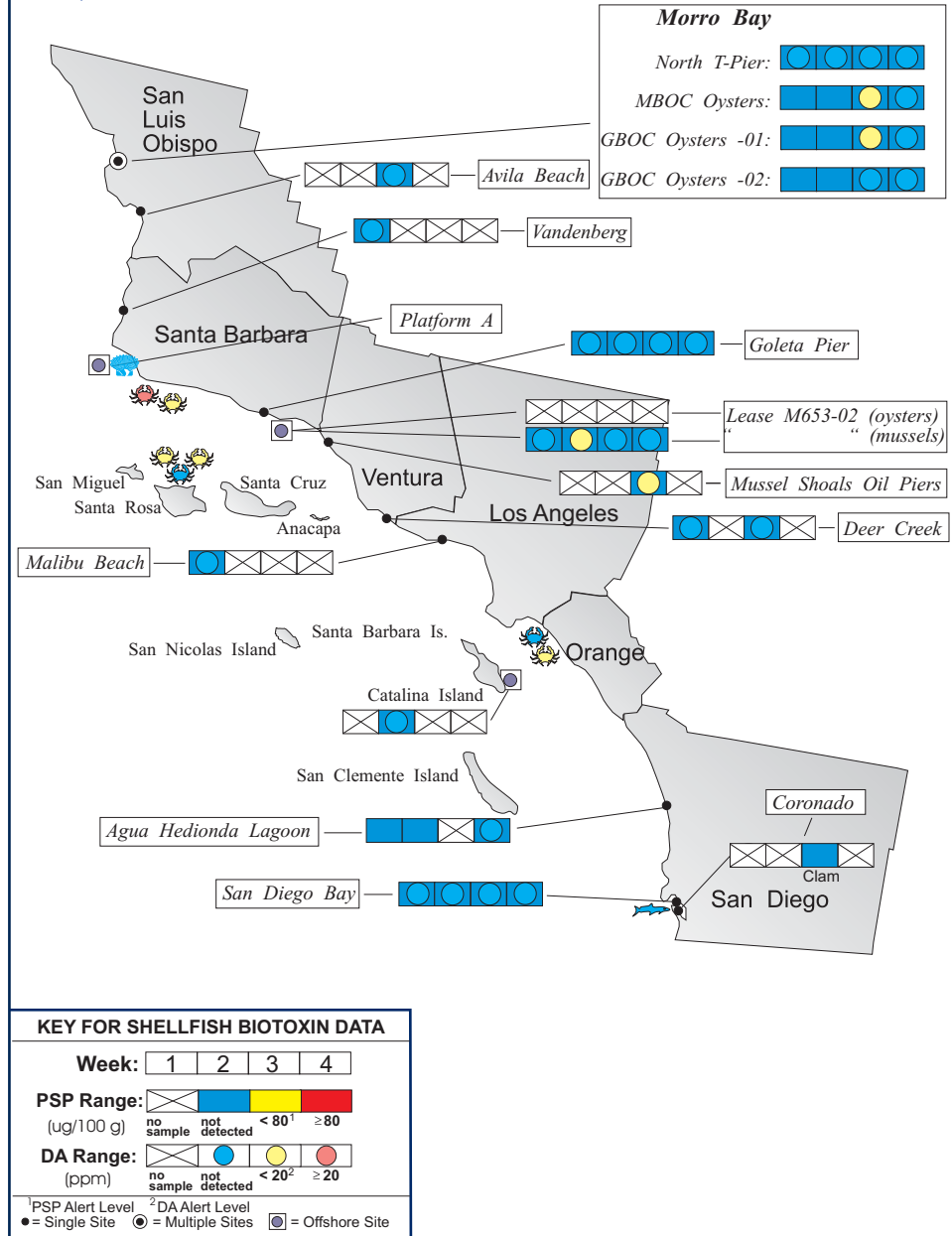
- Single Sampling Station
- Multiple Sampling Stations
- Offshore Sampling Station

For areas with multiple sampling stations, species abundance at each station is represented as follows:

(A,P) = Abundance for *Alexandrium* and *Pseudo-nitzschia*.
e.g., (c,p) = common, present; (a,-) = abundant, not observed

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Figure 3. Distribution of shellfish biotoxins in Southern California during June, 2014.



beginning of the month. *Bacteriastrum* was common in a few San Diego sites.

Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed but rare at sites in most counties (Figure 2). The highest percent composition of *Alexandrium* was observed in a Gulf of the Farallones National Marine Sanctuary sample collected off the coast of Marin on June 20.

Low levels of the PSP toxins were detected at sites in Humboldt, Marin, San Mateo, and Santa Cruz counties. These toxins were detected in Drakes Estero and at Santa Cruz Pier for three out of the four weeks in June. In Humboldt county, PSP activity decreased since May, with low levels detected at the beginning of the month in outer Humboldt Bay and at end of the month in the Trinidad area.

Domoic Acid

Pseudo-nitzschia was observed at most sampling sites in June, decreasing in relative abundance at most sites compared to observations in May (Figure 2). The highest relative abundance of *Pseudo-nitzschia* was observed at Rodeo Beach in Marin (May 2).

Domoic acid was detected in low levels for the first week of June at Santa Cruz Pier. Crab and fish samples were collected by the CDPH Food and Drug Branch from

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

For More Information Please Call:
(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553-4133

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Monterey Bay. The sardine samples were below the alert level. The majority of crab samples contained low levels of domoic acid in the viscera. Four samples of crab viscera exceeded the alert level, with the highest at 160 ppm of domoic acid.

Non-Toxic Species

The diatoms *Skeletonema* and *Chaetoceros* were common at sites between Humboldt and Santa Cruz counties. *Asterionella* was common in Bodega Harbor and abundant in Half Moon Bay and Pescadero State Beach.



QUARANTINES:

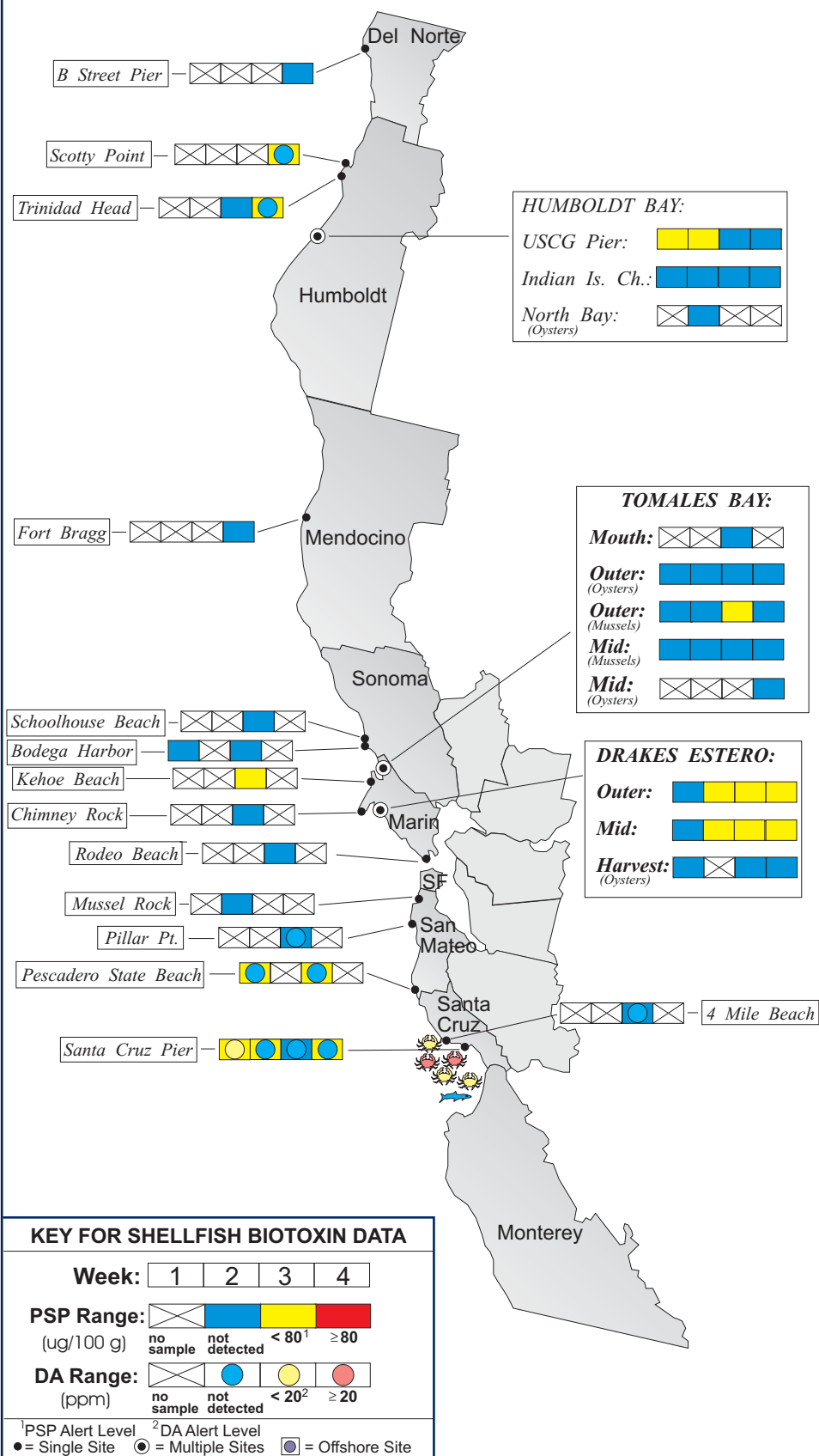
The annual mussel quarantine began on May 1. This annual quarantine applies to sport-harvested mussels along the entire California coastline, including all bays and estuaries.

Due to the duration of the domoic acid event in Santa Cruz and Monterey, an updated Health Advisory was issued on April 28 to ensure the public was aware of the continued risk associated with consuming bivalve shellfish or the viscera of crab and small finfish like anchovy and sardine.

The September 14 health advisory for the northern Channel Islands remained in effect. The advisory warned consumers to avoid eating bivalve shellfish or the internal organs of crab, lobster, and small finfish like sardines and anchovies from the affected region due to persistent elevated levels of domoic acid in crab viscera samples.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can

Figure 4. Distribution of shellfish biotoxins in Northern California during June, 2014.



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Table 1. Program participants collecting phytoplankton samples during June, 2014. (Continued from Page 4)

AGENCY	#	AGENCY	#
DEL NORTE COUNTY		Del Norte County Health Department	1
HUMBOLDT COUNTY			
Coast Seafood Company	4	Humboldt State University Marine Lab	4
MENDOCINO COUNTY		CDPH Volunteer (<i>Marie DeSantis</i>)	3
SONOMA COUNTY		CDPH Marine Biotoxin Program	2
MARIN COUNTY			
Golden Gate National Rec. Area	1	CDPH Volunteer (<i>Anderson, Clyde</i>)	6
SFSU, Romberg Tiburon Center	2	Hog Island Oyster Company	4
Sonoma State University	1	Gulf Farallones National Marine Sanctuary	1
Drakes Bay Oyster Company	12	CDPH Marine Biotoxin Program	1
SAN FRANCISCO COUNTY		CDPH Volunteer (<i>Eugenia McNaughton</i>)	1
Gulf Farallones National Marine Sanctuary	3	Exploratorium	3
SAN MATEO COUNTY			
San Mateo County Environmental Health Dept.	6	U.C. Santa Cruz - Ano Nuevo	3
The Marine Mammal Center (<i>Stan Jensen</i>)	4	CDPH Volunteer (<i>John Lo</i>)	1
SANTA CRUZ COUNTY		U.C. Santa Cruz	4
MONTEREY COUNTY		Friends of the Sea Otter (<i>Janis Chaffin</i>)	4
Marine Life Studies	2	CDPH Volunteer (<i>Jerry Norton</i>)	1
SAN LUIS OBISPO COUNTY			
Morro Bay National Estuary Program	2	Grassy Bar Oyster Company	1
Coastal Discovery Center, San Simeon	3	Tenera Environmental	3
CDPH Marine Biotoxin Program	2	CDPH Volunteer (<i>Al Guild</i>)	4
Friends of the Sea Otter (<i>Kelly Cherry</i>)	4	Morro Bay Oyster Company	2
SANTA BARBARA COUNTY			
HABNet/CDPH Volunteers (<i>Amiri</i>)	7	Island Packers/HABNet	1
Santa Barbara Channel Keeper	4	Santa Barbara Mariculture Company	5
CDPH Volunteer (<i>Sylvia Short</i>)	2	U.C. Santa Barbara	4
VENTURA COUNTY			
CDPH Volunteer (<i>Fred Burgess</i>)	2	National Park Service	2
LOS ANGELES COUNTY			
Tole Mour	2	Southern California Marine Institute	1
Los Angeles County Sanitation District	1	CDPH Volunteer (<i>Cal Parsons</i>)	2
ORANGE COUNTY		Amigos de Bolsa Chica	4
California Department of Fish and Wildlife	4	National Oceanic and Atmospheric Admin.	1
SAN DIEGO COUNTY			
Scripps Institute of Oceanography	5	Sea Camp/HABNet	1
U.S. Navy Marine Mammal Program	3	Tijuana River National Estuary Research	4
Carlsbad Aquafarms, Inc.	1	CDPH Volunteer (<i>Cynthia Hall</i>)	2

concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins can produce a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms can be followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of seafood species such as crab, lobster, and small finfish like

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Table 2. CDPH program participants submitting shellfish samples during June, 2014.

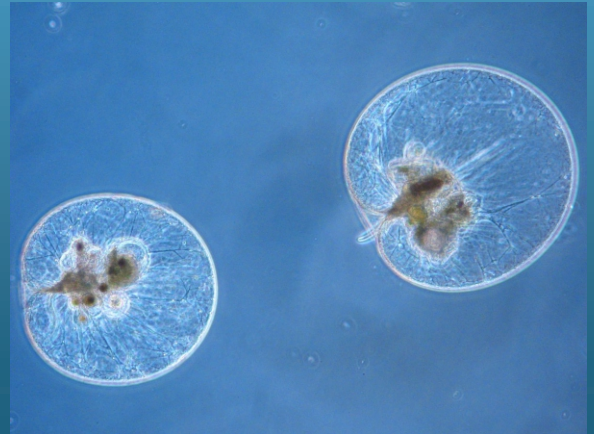
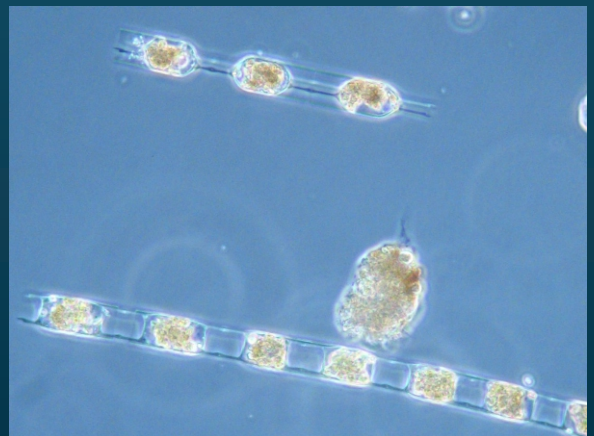
COUNTY	AGENCY	#
Del Norte	CDPH Volunteer (Harriet Jenesky)	1
Humboldt	Coast Seafood Company	10
	Humboldt State University Marine Lab	2
	Humboldt County Environmental Health Department	1
Mendocino	Mendocino County Environmental Health Department	1
Sonoma	CDPH Marine Biotoxin Program	3
Marin	Cove Mussel Company	6
	Drakes Bay Oyster Company	14
	CDPH Marine Biotoxin Program	2
	Hog Island Oyster Company	6
	Tomales Bay Oyster Company	5
	Starbird Mariculture	1
	CDPH Volunteer (<i>Peter Schmidt</i>)	1
	CDPH Volunteer (<i>Jamie Sutton</i>)	1
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	3
	CDPH Volunteer (<i>Gary Della Maggiora</i>)	1
Santa Cruz	U.C. Santa Cruz	4
	CDPH Volunteer (<i>Michael Wolcott</i>)	1
Monterey	CDPH Food and Drug Branch	14
San Luis Obispo	Grassy Bar Oyster Co.	16
	Morro Bay Oyster Company	10
	CDPH Marine Biotoxin Program	1
Santa Barbara	Santa Barbara Mariculture Company	5
	U.C. Santa Barbara	5
	CDPH Food and Drug Branch	6
	Vandenberg AFB	1
Ventura	Ventura County Environmental Health Department	3
Los Angeles	CDPH Volunteer (<i>Cal Parsons</i>)	1
	CDPH Volunteers (<i>Vladimir Igoshin</i>)	1
	CDPH Food and Drug Branch	5
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4
	U.S. Navy Marine Mammal Program	6
	CDPH Volunteer (<i>Steve Crooke</i>)	1

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sardines and anchovies, therefore these tissues should not be consumed. Contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.



PHYTOPLANKTON GALLERY

The unarmored dinoflagellate *Noctiluca*.The pseudocolonial dinoflagellate *Polykrikos*.Two different angles of the chain forming diatom *Hemiaulus*.